

## **Methodology for the Puerto Rico Commonwealth Population Estimates by Age and Sex (Vintage 2011): April 1, 2010 to July 1, 2011**

The U.S. Census Bureau produces annual estimates of the resident population for the Commonwealth of Puerto Rico. The estimates are produced by age and sex using a cohort-component approach as described below.

### **Overview**

The cohort component approach starts with the 2010 Census by age and sex as its base population. It then follows each birth cohort as it ages and is exposed to mortality and migration. The estimates are produced annually by age and sex by updating the base population with data on the demographic components of population change: net migration and births are added and deaths are subtracted each year.

The basic procedure used to estimate the population is:

- (1) base population
- (2) plus births to Puerto Rico resident women
- (3) minus deaths to Puerto Rico residents
- (4) plus net migrants

The procedure is repeated for each year of the estimation period, by age and sex.

### **Method**

#### Base Population

The 2010 Census base population for the Commonwealth serves as the starting point for the estimates by sex and single year of age (0-99 and 100+).

#### Fertility

The Puerto Rico Institute of Statistics provided preliminary birth data for the period of January 2010 to December 2010 by month. These data were derived from the Puerto Rico Department of Health's vital registration system. The information on births for the Commonwealth includes year, month of birth, sex of child, age of mother, mother's country of residence, and mother's municipio of residence if residing in Puerto Rico.

Some records (less than 1 percent) were missing information for one or more variables. This missing information is imputed using information from the previous record. Births to mothers who reside outside Puerto Rico are excluded from the estimates. Births for 2011 are projected by holding the 2010 preliminary numbers constant.

## Mortality

The Puerto Rico Institute of Statistics provided preliminary death data for the period of January 2010 to December 2010 by month. These data were derived from the Puerto Rico Department of Health's vital registration system. The information on deaths for the Commonwealth includes year and month of death, sex, age, and the municipio of residence if residing in Puerto Rico.

Some records (less than 1 percent) were missing information for one or more variables. This missing information is imputed using information from the previous record. Deaths to people who reside outside Puerto Rico are excluded from the estimates. Deaths for 2011 are projected by holding the 2010 preliminary numbers constant.

## Net Migration

Migration estimates used in producing the annual Puerto Rico population estimates consist of two components: movement from the United States (US) into Puerto Rico (PR) (referred to as 'ins') and movement from Puerto Rico to the United States (referred to as 'outs'). The US/PR ins and outs are estimated using a respondent's current residence and the 'Residence One Year Ago' (ROYA) question in the American Community Survey (ACS) and the Puerto Rico Community Survey (PRCS) single year files. Respondents living in Puerto Rico and indicating residence in the United States during the previous year are categorized as ins. Respondents living in the United States and indicating Puerto Rico residence during the previous year are labeled outs. Because children under 1 year of age would not have a residence one year ago the value is assumed to be ½ the estimate for the 1 year olds. Total US/PR ins and outs by sex for the Commonwealth are calculated using the 1-year (2010) ACS file. Age distributions are calculated using the 3-year (2008-2010) ACS file and smoothed using a penalized least squares regression.